WHAT IS CLAIMED IS:

1. A method for preparing a library of compounds, comprising:

a) providing a plurality of individual bead aggregates, wherein each of said bead aggregates comprises a population of compound beads and a population of coding beads, wherein said compound beads and said coding beads are crosslinked to each other, wherein each of said compound beads comprises a scaffold linked to said compound bead via a scaffold linker, and with at least two scaffold functional groups attached to said scaffold, and wherein each of said coding beads comprises at least one coding functional group;

b) contacting a first bead aggregate with a first reactive component such that a first scaffold functional group reacts with said first reactive component to afford a first scaffold building block;

c) contacting said first bead aggregate with a successive reactive component such that a subsequent scaffold functional group reacts with said successive reactive component to afford a subsequent scaffold building block;

d) repeating step c) until said first compound has been prepared; and

e) subjecting additional bead aggregates to steps b) - d) with additional reactive components to prepare said library of compounds.

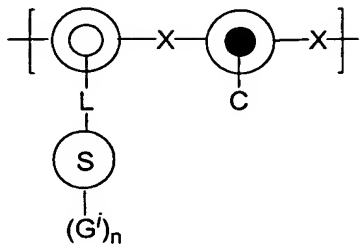
2. The method of claim 1, further comprising the following step:

f) cleaving each of said compounds from each of said bead aggregates.

3. The method of claim 1, wherein said reactive component is attached via a reaction selected from the group consisting of amine acylation, reductive alkylation, aromatic reduction, aromatic acylation, aromatic cyclization, aryl-aryl coupling, [3+2] cycloaddition, Mitsunobu reaction, nucleophilic aromatic substitution, sulfonylation, aromatic halide displacement, Michael addition, Wittig reaction, Knoevenagel condensation, reductive amination, Heck reaction, Stille reaction, Suzuki reaction, Aldol condensation, Claisen condensation, amino acid coupling, amide bond formation, acetal formation, Diels-Alder reaction, [2+2] cycloaddition, enamine formation, esterification, Friedel Crafts reaction, glycosylation, Grignard reaction, Horner-Emmons reaction, hydrolysis, imine formation, metathesis reaction, nucleophilic substitution, oxidation, Pictet-Spengler reaction, Sonogashira reaction, thiazolidine formation, thiourea formation and urea formation.

4. The method of claim 1, wherein the compounds of said library are prepared in parallel.

5. The method of claim 1, wherein said bead aggregates comprise units of formula I:



(I)

wherein

$(G^i)_n$ represents n independent scaffold functional groups, G^1 to G^n, wherein each G^i is a scaffold functional group;

is a scaffold;

L is a scaffold linker;


is said compound bead, wherein the inner circle represents an interior portion of said compound bead, and the outer circle represents an exterior portion of said compound bead;


is said coding bead, wherein the darkened portion represents an interior portion of said coding bead, and the lightened portion represents an exterior portion of said coding bead;

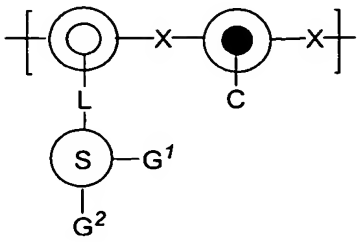
C represents said coding functional group;

X is a crosslinker linking said compound bead to said coding bead;

subscript n is an integer from 2 to 10; and

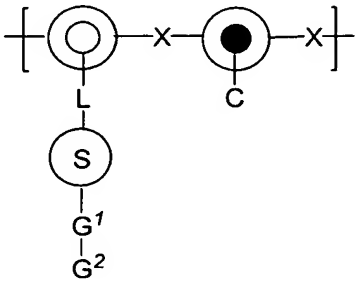
superscript *i* is an integer from 1 to n.

6. The method of claim 5, wherein said bead aggregates comprise units of formula Ia:



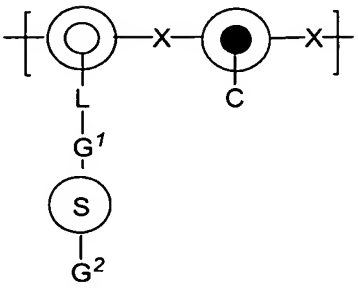
(Ia).

7. The method of claim 5, wherein said bead aggregates comprise units of formula Ib:



(Ib).

8. The method of claim 5, wherein said bead aggregates comprise units of formula Ic:

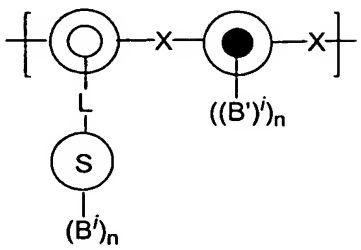


(Ic).

9. The method of claim 1, further comprising the step of encoding each of said scaffold building blocks with a coding building block.

10. The method of claim 9, wherein each of said scaffold building blocks is encoded with one of said coding building blocks prior to, simultaneously with, or following each of said contacting steps of claim 1.

11. The method of claim 9, wherein said steps b) - d) afford bead aggregates comprised of units of formula II:



(II)

wherein

$(B^i)_n$ represents n independent scaffold building blocks, B^1 to B^n, wherein each B^i is a scaffold building block;

is a scaffold;

L is a scaffold linker;


is said compound bead, wherein the inner circle represents an interior portion of said compound bead, and the outer circle represents an exterior portion of said compound bead;


is said coding bead, wherein the darkened portion represents an interior portion of said coding bead, and the lightened portion represents an exterior portion of said coding bead;

X is a crosslinker linking said compound bead to said coding bead;

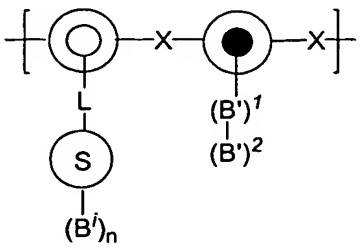
subscript n is an integer from 2 to 10; and

superscript *i* is an integer from 1 to n.

12. The method of claim 11, wherein said encoding step occurs following said contacting step.

13. The method of claim 12, wherein subsequent coding building blocks are attached to said coding bead via previously attached coding building blocks.

14. The method of claim 13, wherein said bead aggregates comprise units of formula IIa:



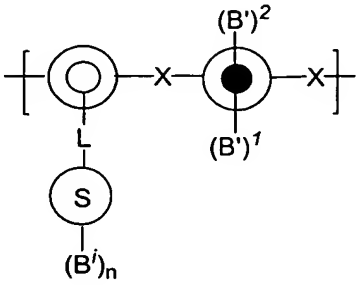
(IIa)

wherein subscript n is 2.

15. The method of claim 11, wherein said encoding step is performed simultaneously with said contacting step.

16. The method of claim 15, wherein each of said coding building blocks is separately attached to said coding bead.

17. The method of claim 16, wherein said bead aggregates comprise units of formula IIb:



(IIb)

wherein subscript n is 2.

18. The method of claim 1, wherein said compound beads and said coding beads are present in each of said bead aggregates in a ratio of 99.9/0.1 to 50.0/50.0.

19. The method of claim 1, wherein said scaffold is the same on each of said bead aggregates.

20. The method of claim 1, wherein at least two different scaffolds are used.

21. The method of claim 1, wherein said library of compounds is prepared via a split-mix methodology.

22. A library of compounds prepared by the method of claim 1.

23. A library of compounds prepared by the method of claim 2.

24. A method for identifying a compound of claim 2 that binds to a target, said method comprising:

a) contacting said compound of claim 2 with said target; and

b) determining the functional effect of said compound upon said target.

25. A method for preparing a library of compounds, comprising:

a) providing a plurality of individual bead aggregates, wherein each of said bead aggregates comprises a population of compound beads and a population of coding beads, wherein said compound beads and said coding beads are crosslinked to each other, wherein each of said compound beads comprises a scaffold linked to said compound bead via a scaffold linker, and with at least two scaffold functional groups attached to said scaffold, and wherein each of said coding beads comprises at least one coding functional group;

b) splitting said bead aggregates into two or more separate pools;

c) contacting said bead aggregates with one or more first reactive components in said two or more separate pools such that a first scaffold functional group reacts with one of said first reactive components to afford a first scaffold building block, wherein said contacting step affords subsequent bead aggregates;

d) encoding each of said scaffold building blocks with a coding building block, comprising the step of contacting said coding functional group with a reactive component such that said coding functional group reacts with said reactive component to afford a coding building block linked to said coding bead, wherein said coding building block encodes one of said scaffold building blocks, and wherein said encoding step yields subsequent encoded bead aggregates;

e) mixing said subsequent encoded bead aggregates from said two or more separate pools into a single pool;

f) splitting said subsequent encoded bead aggregates into two or more separate pools;

g) contacting said subsequent encoded bead aggregates in said two or more separate pools with a successive reactive component such that a subsequent scaffold functional group reacts with said successive reactive component to afford a subsequent scaffold building block, wherein said contacting step yields further bead aggregates;

h) repeating step d), wherein said encoding step yields further encoded bead aggregates;

i) repeating steps e) - h), wherein said further encoded bead aggregates of step h) become said subsequent encoded bead aggregates of step e), until said library of compounds has been prepared.